Introducing Dash for R

Ryan Patrick Kyle, Senior R Developer • R-Ladies Montréal, 19 September 2019

Overview

- What's Dash?
- A brief tour of the Dash gallery
- Installing Dash for R + libraries
- Building a simple Dash app
- Helpful resources
- Q&A

What's Dash?

- Framework for creating analytical web applications in Python and R
- Created by Chris Parmer, originally released in 2017
- Dash for Python relies on Flask as the underlying web server, while Dash for R uses Fiery and httpuv
- Make functional, sophisticated apps — *no JavaScript required*
- Dash for R is MIT-licensed, open source, and completely free!

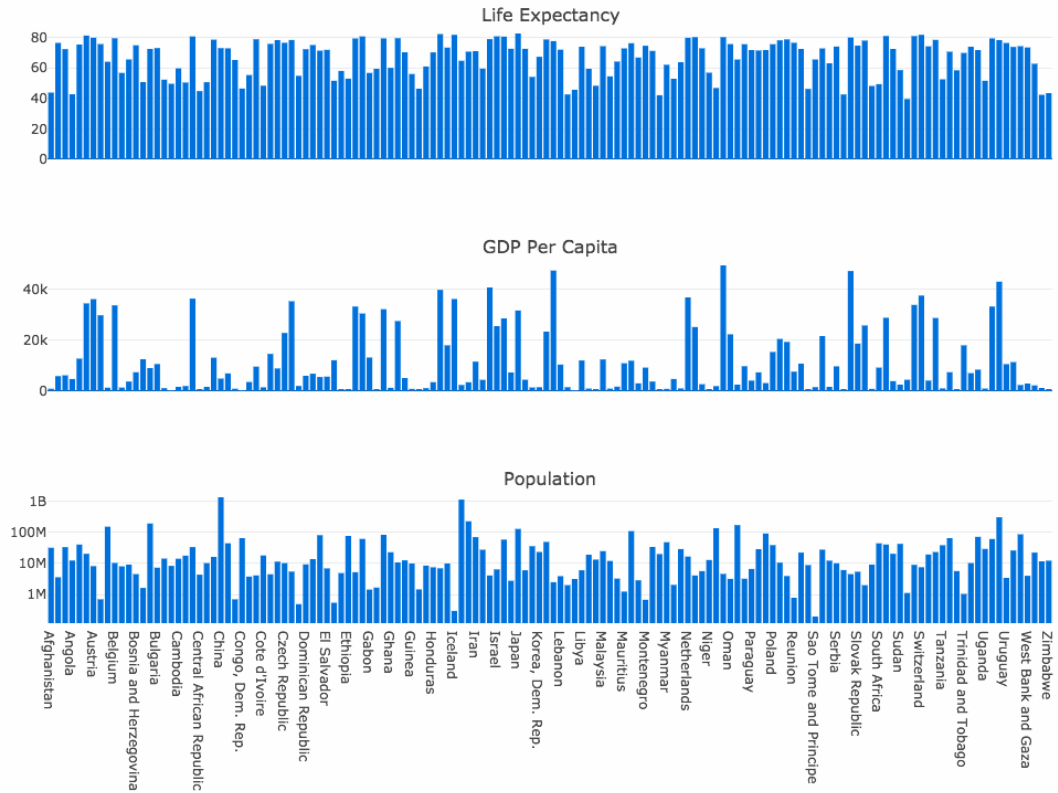
What's Dash?

- Dash for R development began in summer 2017
- Early work by Carson Sievert
- Officially released in July during useR! 2019
- Syntax nearly identical to Dash for Python, by design
- Interface elements are provided by React components

Dash DataTable

FILTER ROWS

continent	country	gdpPercap	lifeExp	pop	year
Asia	Afghanistan	974.5803384	43.828	31889923	2007
Europe	Albania	5937.02952599999	76.423	3600523	2007
Africa	Algeria	6223.367465	72.301	33333216	2007
Africa	Angola	4797.231267	42.731	12420476	2007
Americas	Argentina	12779.3796400000	75.32	40301927	2007
Oceania	Australia	34435.3674399999	81.235	20434176	2007
Europe	Austria	36126.4927	79.829	8199783	2007
Asia	Bahrain	29796.0483399999	75.635	708573	2007
Asia	Bangladesh	1391.253792	64.062	150448339	2007



Dash Component Libraries

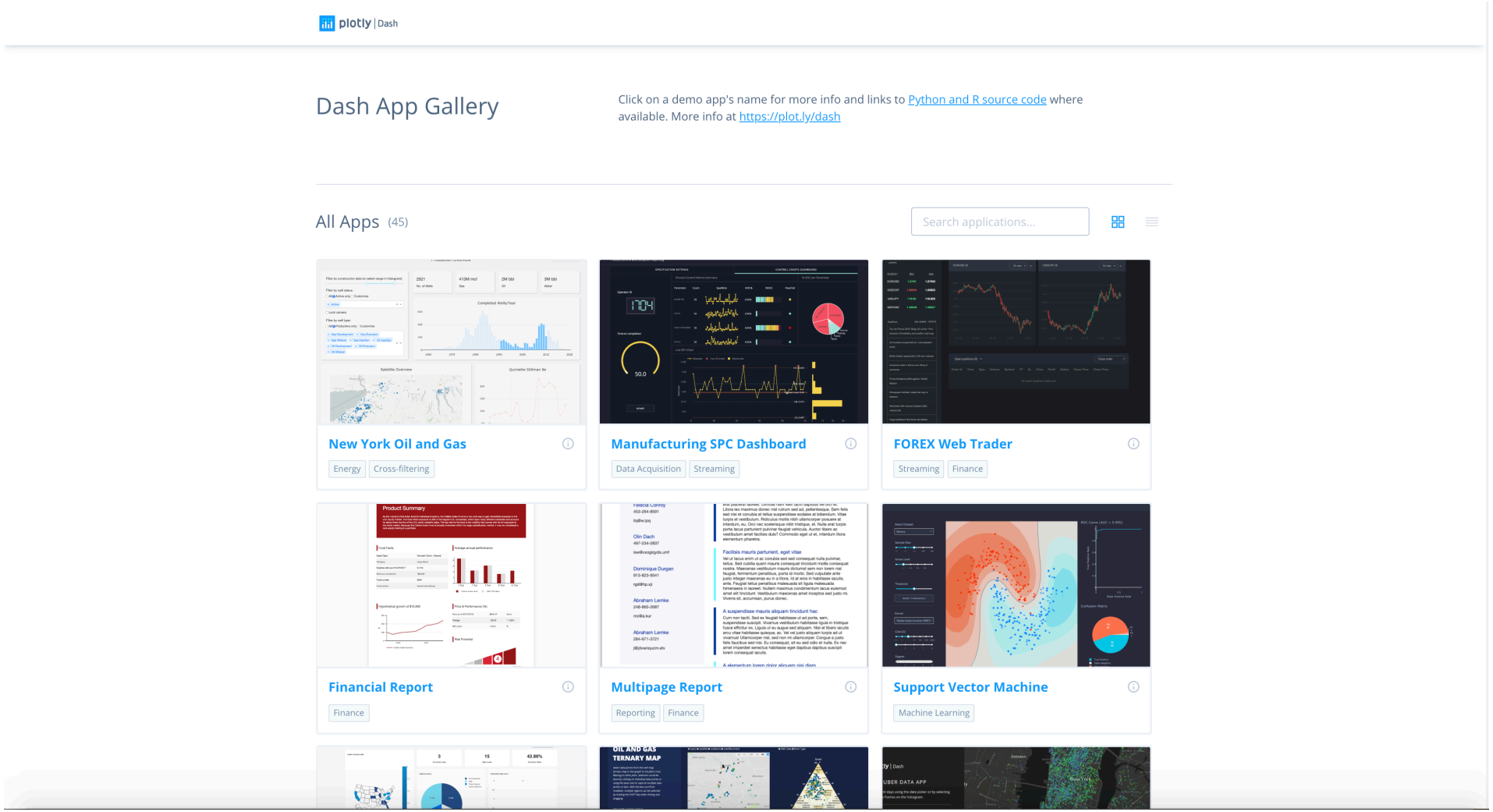
- **Dash Core Components**
- **Dash HTML Components**
- **Dash Table**

- Dash Bio
- Dash Cytoscape
- Dash Canvas
- Dash DAQ

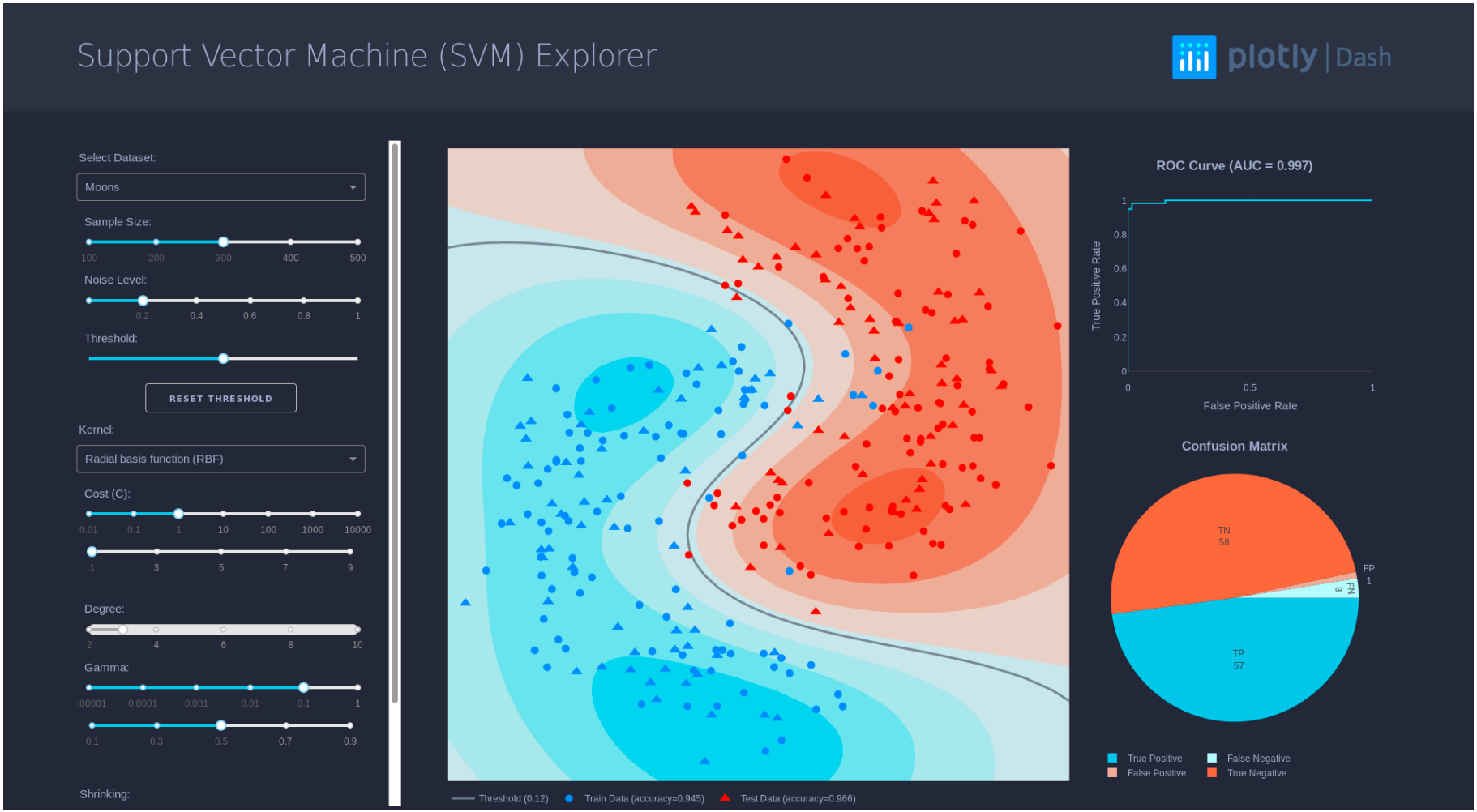
- *Dash Design Kit**
- *Dash Snapshot Engine**
- *Dash Analytics**

Let’s take a look at a few sample applications …

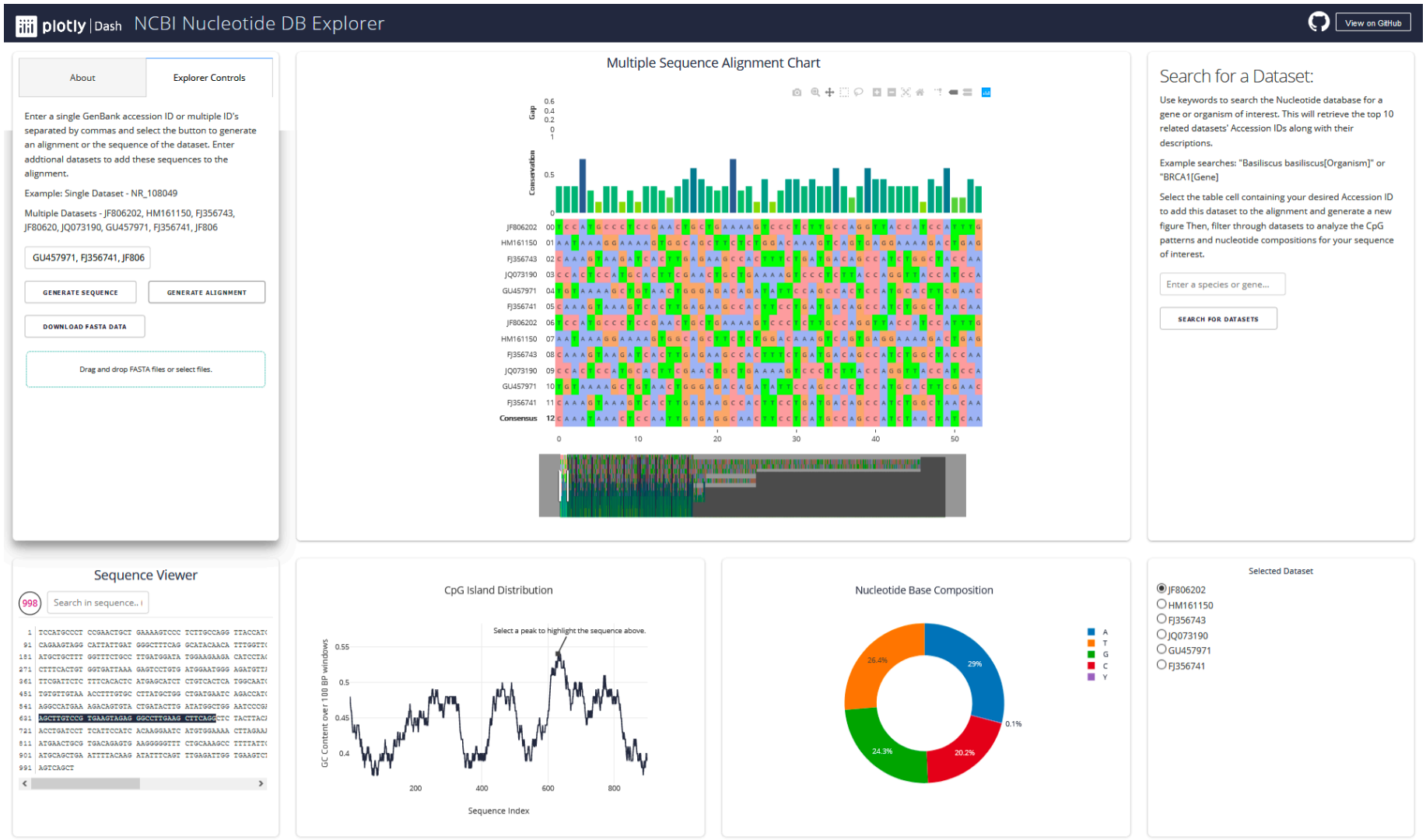
Dash Gallery



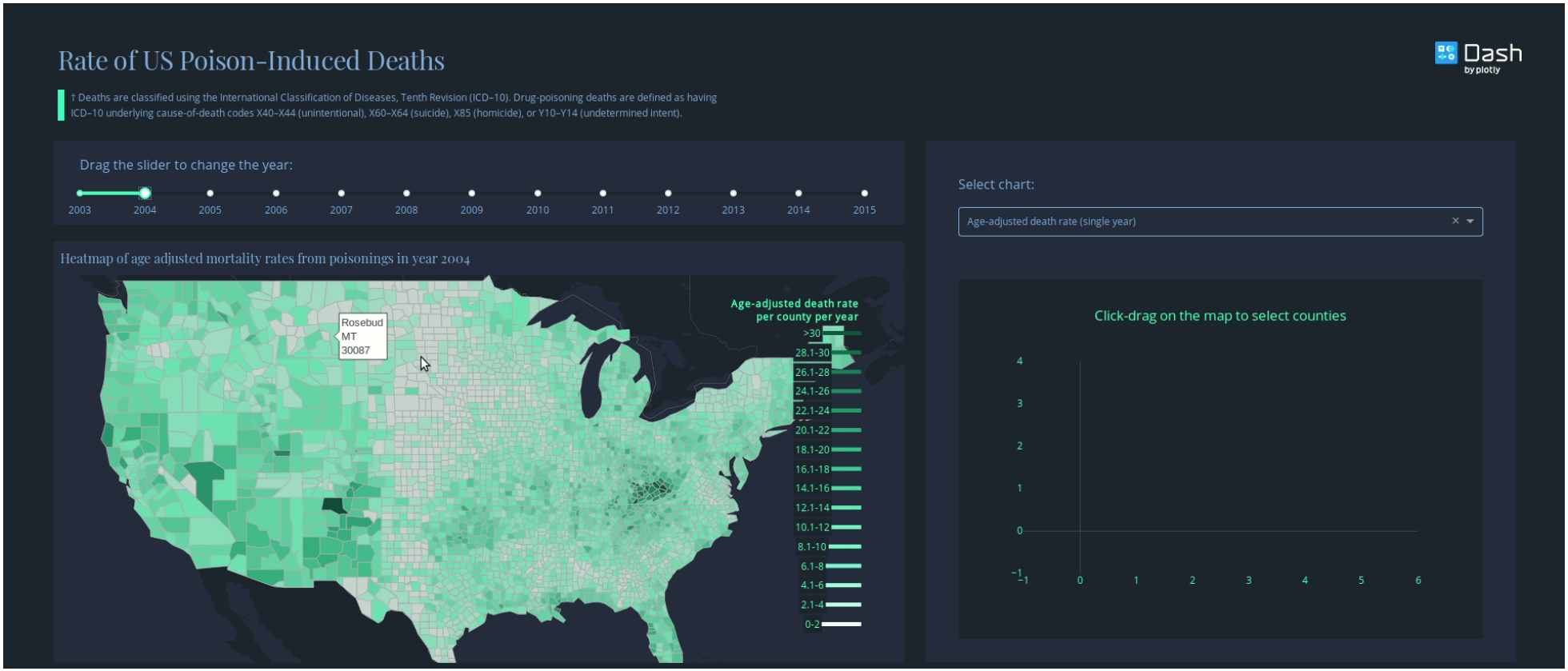
Dash Gallery



Dash Gallery



Dash Gallery



Cool! How do I get started using Dash?

Installing Dash

- Version 1.0 of the **`dash`** package will land on CRAN soon
- For now, the current release is available via GitHub!

```
library(devtools)
# installs dashHtmlComponents, dashCoreComponents, and dashTable
install_github("plotly/dashR", upgrade = TRUE)
```

Installing Dash

- Install syntax is very similar for other Dash packages:

```
install_github("plotly/dash-bio", upgrade = TRUE)
install_github("plotly/dash-canvas", upgrade = TRUE)
install_github("plotly/dash-cytoscape", upgrade = TRUE)
install_github("plotly/dash-daq", upgrade = TRUE)
```

Building a simple Dash app

- Dash apps have two fundamental parts:
  - **Layout** - *provides structure, controls app appearance*
  - **Callbacks** - *update component properties whenever inputs change*
- If you've used Shiny, the **`layout`** portion of a Dash app is analogous to the **`ui`** of a Shiny app
- And a callback is (vaguely) like **`server`** in a Shiny app

Building a simple Dash app

- Dash apps can have multiple **callback** statements
- Dash for R also supports multiple **outputs**
- The **`layout`** portion of a Dash app is a hierarchical tree of page elements —in Dash, we can nest components as ***children*** of other components

Building a simple Dash app

plotly | Dash

- Breaking it down a bit more, as I see it:
  - In R, components are functions whose arguments are component properties (in Python, they are classes)
  - Callbacks produce **outputs** from inputs, which update component properties (e.g. values, figures, hoverdata)
  - This relationship is *very general*, once you've got the basic idea, the rest is pretty straightforward! 🙂

Building a simple Dash app

- OK, let's try building a Dash for R app from scratch
- I'll individually demo the app features one-by-one
- … then tie them together in the last step

Brief break for questions / live coding exercise

Brief break for questions / live coding exercise

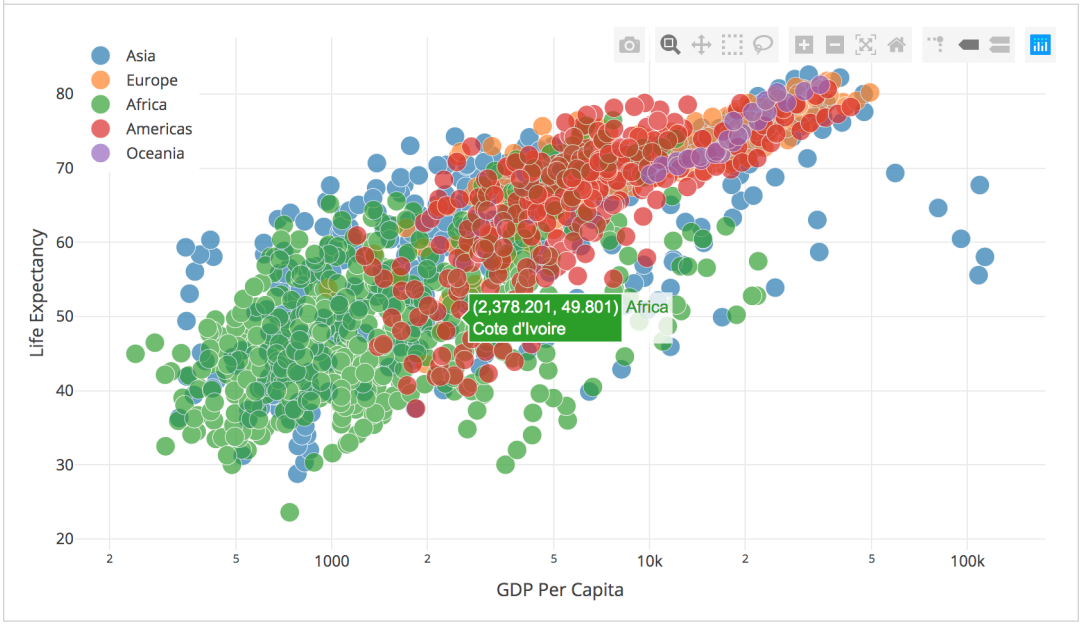
if you'd like to follow along, just visit
https://github.com/rpkyle/rladies-mtl-demo

Helpful Resources

dashr.plot.ly/getting-started

```
        )
      )
    )
  )
)

#app$run_server()
```



*These graphs are interactive and responsive. **Hover** over points to see their values, **click** on legend items to toggle traces, **click and drag** to zoom, **hold down shift, and click and drag** to pan.*

Markdown

While Dash exposes HTML through the `dashHtmlComponents` package, it can be tedious to write your copy in HTML. For writing blocks of text, you can use the `dccMarkdown` component in the `dashCoreComponents`

Helpful Resources

- https://dashr.plot.ly (Interactive R documentation)
- https://community.plot.ly/ (Community forum)
- Several component libraries also provide vignettes
- https://dash-gallery.plotly.host/Portal/ (Sample apps)

Helpful Resources

- https://twitter.com/plotlygraphs
- ryan@plot.ly
- https://twitter.com/ryanpkyle

Acknowledgements

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- And to R-Ladies MTL for giving me a chance to present